



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/688,764	10/16/2000	Li Deng	M61.12-0325	1585

7590 01/24/2005

WESTMAN CHAMPLIN & KELLY
Suite 1600 - International Centre
900 South Second Avenue
Minneapolis, MN 55402-3319

EXAMINER

OPSASNICK, MICHAEL N

ART UNIT PAPER NUMBER

2655

DATE MAILED: 01/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/688,764

Applicant(s)

DENG ET AL.

Examiner

Michael N. Opsasnick

Art Unit

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22 and 23 is/are allowed.
- 6) ☒ Claim(s) 1, 12, 13, 24-26 and 29 is/are rejected.
- 7) ☒ Claim(s) 2-11, 14-21, 27, 28 and 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 12.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. Claims 22,23 are allowable over the prior art of record.
2. Claims 2-11,14-21,27,28,30, and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
3. The following is a statement of reasons for the indication of allowable subject matter: As per claims 2,14,22,24,27,30 the recited limitations pertaining to the generation of mixture components (which are derived from the noise channel vectors -- pp 22 of the specification), in combination with the generation of correction vectors, (as detailed on pp 19, lines 1-14 of the specification), is not explicitly taught by the prior art of record.

With respect to the prior art of record, it is old and well known to take measurements of “clean” and “noisy” speech channels, and to use that information to improve the accuracy of the speech recognition channel. For example, under applicant’s admitted prior art (pp 3 of the specification), noisy correction vectors are generated by subtracting noise channel vectors from clean channel vectors, and then applying this correction vector to a training signal or test signal. In other areas of prior art, noisy feature vectors are compared to clean channel feature vectors to identify a mixture component that best aligns with the feature vector, however, such alignment is

Art Unit: 2655

not ideal since the comparison is to clean channel feature vectors, not noisy channel feature vectors. One detailed example of the prior art of record is Trompf et al (5758022), wherein stress related variations in speech vectors are compared to stress-free speech vectors for training the neural network, and also applying a third type of speech vector to account for background noise (col. 3 lines 40-55). Moreno et al ("Multivariate Gaussian Based Cepstral Normalization for Robust Speech Recognition, 1995, IEEE), teaches adding to the mean and variance of clean speech vectors the mean and variance components of noisy speech vectors to calculate a compensation factor to account for the noise background during actual speech recognition (pp 138), with the correction terms being in the form as shown on pp 139, equations 12, and 13. Neumeyer et al ("Probabilistic optimum filtering for Robust Speech Recognition", 1994 IEEE Conference on Acoustics, Speech, and Signal Processing) teaches mapping clean and noisy speech features (page I-418, col. 1-2). However, these correction terms are not based upon derivation from noisy speech channels, nor of the same structure as covered in the scope of the recited claim language above. Furthermore, it would not have been obvious to one of ordinary skill in the art of speech noise modeling to modify the teachings of the prior art of record to obtain the recited claim limitations of the independent claims as listed above.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1,12,13,24-26,29 are rejected under 35 U.S.C. 102(b) as being anticipated by Adlersberg et al (5012519).

As per claim 1, Adlersberg et al (5012519) teaches a method of noise reduction for reducing noise in a noisy input signal (as screening noise (col. 3 lines 55-62) comprising:

“grouping noisy channel features....mixture components” as combining noise signals into clean speech (Fig. 4, subblocks 9→53,52→ 58);

“fitting a function....at least one scaling vector” as using a background noise estimator to calculate noise, apply a fixed SNR for the desire noise floor (col. 8 lines 11-67)

“multiplying the scaling vector.....feature vectors” as setting the gain according to the noise estimates (Fig. 7,9,11; and col. 13 lines 20-45);

“adding a correction vector.....noisy input signal” as multiplying the clean vectors with a gain to reduce the noise of the original signal (col. 10 lines 10-50).

As per claim 12, Adlersberg et al (5012519) teaches:

“identifying a mixture....signal” as calculating the gain mixture rep. The noise estimate for reduced noise (col. 8 line 11 – col. 9 line 65);

“multiplying.....feature vector” as ” as setting the gain according to the noise estimates (Fig. 7,9,11; and col. 13 lines 20-45);

“adding the correction vector.....clean signal” as multiplying the clean vectors with a gain to reduce the noise of the original signal (co. 10 lines 10-50).

As per claim 13, Adlersberg et al (5012519) teaches identifying a most likely mixture component for the noisy vector (as calculating the gain mixture rep. The noise estimate for reduced noise (col. 8 line 11 – col. 9 line 65).

As per claim 24, Adlersberg et al (5012519) teaches:

“accessing a set.....noisy channel signal.....clean channel signal” as noisy spectral amplitudes as well as the clean channel signals (col. 9 lines 20-30; col. 7 lines 45-60)

“grouping.....mixture components” as grouping of noisy spectral estimates (Col. 7 lines 30-45)

“determining a correction value....clean channel vectors” as multiplying the clean vectors with a gain to reduce the noise of the original signal (co. 10 lines 10-50).

Art Unit: 2655

As per claim 25, Adlersberg et al (5012519) teaches:

“determining a correction value.....clean channel vectors” as fitting according to amount of allowable SNR (col. 8 lines 4-37).

As per claim 26, Adlersberg et al (5012519) teaches:

“fitting a function comprises performing a linear least squares calculation” as minimum mean square calculation (col. 6 lines 64-67).

As per claim 29, Adlersberg et al (5012519) teaches:

“determining an additive correction value and a scaling correction value” as adding and scaling (col. 9 line 45 – col. 10 line 10).

Art Unit: 2655

Conclusion

6. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872 9314,

(for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Opsasnick, telephone number (703)305-4089, who is available Tuesday-Thursday, 9am-4pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Doris To, can be reached at (703)305-4827. The facsimile phone number for this group is (703)872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group 2600 receptionist whose telephone number is (703) 305-4750, the 2600 Customer Service telephone number is (703) 306-0377.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mno

1/17/05


DAVID L. OMETZ
PRIMARY EXAMINER